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OFFICE OF PREVENTION, PESTICIDES AND TOXIC SUBSTANCES

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## **MEMORANDUM**

DATE:

December 1, 2008

**SUBJECT:** 

The Drinking Water Degradates Identification Memorandum for

Saflufenacil.

TO:

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Residues of Concern Knowledgebase Subcommittee

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This memorandum identifies the environmental degradates of saflufenacil that may be of exposure concern for drinking water assessment. These data are provided to help inform determinations of which environmental degradates are of risk concern for drinking water assessment in support of human health risk assessment. If you have questions about this memorandum, please contact Greg Orrick at 703-305-6140.

Saflufenacil is a uracil herbicide that is expected to be mobile to highly mobile. Its major routes of degradation are alkaline hydrolysis and biodegradation in aerobic soil. The compound is expected to degrade with a half-life of 1 to 5 weeks in aerobic soil environments and a half-life of 7 to 15 weeks (2 to 4 months) in aerobic aquatic

environments. Its degradation in anaerobic environments is uncertain. Therefore, saflufenacil is not expected to persist in environments other than acidic to neutral water bodies, which is supported by terrestrial field dissipation half-lives of 2 to 22 days in the continental United States.

Table 1 summarizes the submitted environmental fate data for saflufenacil. Because the submitted data are in review during the writing of this memorandum, all information in this memorandum is provisional.

Table 1. Environmental Fate Data Summary for Saflufenacil

OPPTS Guideline	Data Requirement	Data Summary		
835.2120	Hydrolysis t <sub>1/2</sub> at 25°C	pH 5: Relatively stable pH 7: 248 d pH 9: 4.93 d		
835.2240	Aqueous photolysis t <sub>1/2</sub> at 22°C	57 d (pH5), 22 d (natural)		
835.2410	Soil photolysis t <sub>1/2</sub> at 22°C	83, 87 d		
835.4100	Aerobic soil metabolism t <sub>1/2</sub> at 25°C	30.3, 33.5 d (ID) 24.2, 29.0 d (IL) 8.5, 10.1 d (NJ) 22.8, 24.3 d (WI)		
835.4300	Aerobic aquatic metabolism t <sub>1/2</sub> at 25°C	50.2, 107 d		
835.4400	Anaerobic aquatic metabolism t <sub>1/2</sub> at 25°C	Unacceptable: not anaerobic (27.6, 28.5 d)		
835.1230	Batch equilibrium (K <sub>FOC</sub> )	1.5, 19, 21, 22, 25, 54 L/kg <sub>OC</sub> (saflufenacil) 3.5-27 L/kg <sub>OC</sub> (M01); 0-40 L/kg <sub>OC</sub> (M02); 2.2-111 L/kg <sub>OC</sub> (M07); 4.3-19 L/kg <sub>OC</sub> (M08); 8.1-58 L/kg <sub>OC</sub> (M15); 0-24 L/kg <sub>OC</sub> (M22)		
835.6100	Terrestrial field dissipation t <sub>1/2</sub> (bare ground sites, runoff not measured)	5.9 d (GA) 17.1, 10.4, 24.6 d (AR, IL, Manitoba) 2.4, Stable, 22.3 d (WA, Ontario, CA)		
850.1730	Fish bioconcentration (BCF)	1.57, 0.03, 2.08 and 4.63, 0.33, 5.86 (whole, edible, inedible)		

#### Mobility

Batch equilibrium data on saflufenacil suggest that the compound is mobile to highly mobile in soil (FAO classification; USEPA, 2006), as it does not extensively sorb to soil (Freundlich organic carbon partition coefficients range from 1.5 to 54; MRID 47127829). Major degradates M01, M02, M07, M08, M15, and M22 (chemical names and structures are listed in **Table 2**) display some variability in relative soil mobility, but generally have similar mobility in soil as the parent compound (MRID 47127830). Saflufenacil was detected in submitted terrestrial field dissipation studies at up to the 15-30 cm soil depth (MRID 47128234, 47128235) which is consistent with the low partition coefficients.

Saflufenacil is not volatile, with a partial vapor pressure of 1.5 · 10<sup>-16</sup> torr at 25°C (MRID 47127821). The compound exhibits acid-base behavior (pKa=4.41; MRID 47127817) and is increasingly soluble in water with increasing pH at 20°C (*i.e.*, water solubility is 14 ppm at pH 4 and 2100 ppm at pH 7; MRID 47127819). Consistent with its mobility in

soil and acid-base chemistry, saflufenacil has a low K<sub>OW</sub> of 368 at pH<pKa and an undetermined K<sub>OW</sub> at pH>pKa (MRID 47127818), and is not expected to bioaccumulate (Fish BCF of 0-6x; MRID 47127909). Therefore, transport in the environment is expected to occur predominantly via dissolved residues in surface water runoff and in ground water leachate.

### Degradation

Saflufenacil is slowly photolyzed in water (half-life of 57 days at pH 5; MRID 47127824) and on soil (half-lives of 83 and 87 days; MRID 47127825) at 22°C. Also, the compound is relatively stable to hydrolysis at pH 5, almost stable at pH 7 (half-life of 248 days), and readily hydrolyzed at pH 9 (half-life of 4.9 days; MRID 47127823). Therefore, alkaline hydrolysis is a major degradation route for saflufenacil in high pH environments.

Saflufenacil biodegrades in 1 to 5 weeks in aerobic soil (half-lives of 8.5-34 days; MRID 47445901) and less quickly in aerobic aquatic environments of pH 5.6 to 6.4 (half-lives of 50 and 107 days). Therefore, aerobic soil metabolism is another major degradation route for saflufenacil that will operate in the environment at any pH value.

Biodegradation in anaerobic aquatic environments is uncertain, as the submitted anaerobic aquatic metabolism study systems were aerobically stratified, with anaerobic sediments and aerobic water columns (MRID 47127828). Half-lives were 28 and 29 days, which is less than those for the submitted aerobic aquatic metabolism study. However, system pH values ranged from 5.5 to 8.5, indicating that alkaline hydrolysis may have appreciably contributed to degradation. An anaerobic soil metabolism study is in development and has not been submitted at the time of writing.

Dissipation occurred with half-lives of 2.4 to 22 days in terrestrial field dissipation studies conducted in the continental United States (MRID 47127834, 47127835, 47127836), which is consistent with the submitted, laboratory-derived data. Dissipation was slower in Canadian field plots (half-lives of 25 days and >>20 days).

Major and minor organic degradates of saflufenacil are listed in **Tables 2 and 3**, respectively. Major degradates that are structurally similar to the parent compound include M01, M02, M04, M07, M08, M15, M22, and the soil photolysis product number 8. Major cleavage products of saflufenacil include M26, M29, M31, M33, and TFP. Another major aqueous photolysis product was isolated as well (unknown 3/4/7/6), but not identified. Major degradates that did not decline in amount in unsterile study conditions include M7, M29, and product 8.

## **Degradates of Exposure Concern**

The environmental degradates of saflufenacil that are of exposure concern for drinking water include thirteen of the parent compound's fourteen major organic degradates, M01, M02, M07, M08, M15, M22, M26, M29, M31, M33, TFP, Product 8, and unknown 3/4/7/6. These are major degradates in environmental fate studies that are not transient

and/or may be used to model exposure estimates for saflufenacil residues of concern. M04 is not of exposure concern because it exceeded 10% of the applied only in the hydrolysis study at pH 9 and was not detected 18 days after its peak concentration.

## References

USEPA. 2006. Standardized Soil Mobility Classification Guidance. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Environmental Fate and Effects Division, Memorandum. April 21, 2006.

Table 2. Saflufenacil and Its Major Organic Environmental Degradates.

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	Maximum Final %AR %AR (day) (study length
		PARENT		Production of the control of the con
Saflufenacil BAS 800H	IUPAC: N'-{2-Chloro-4-fluoro-5-[1,2,3,6-tetrahydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)pyrimidin-1-yl]benzoyl}-N-isopropyl-N-methylsulfamide	F、F CH <sub>3</sub> H <sub>3</sub> C、_CH <sub>3</sub>		
	CAS: 2-Chloro-5-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-4-fluoro-N-[[methyl(1-methylethyl)amino] sulfonyl]benzamide	F O O O S O CH <sub>3</sub>		
	CAS-no: 372137-35-4			
	Formula: C <sub>17</sub> H <sub>17</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S MW: 500.86 g/mol			
		MAJOR (>10%) TRANSFORMATION PRO	ODUCTS	
M01	N'-[2-Chloro-4-fluoro-5-(3-methyl-	CI	Aerobic soil	<b>10</b> (57) 1.3 (330)
	2,6-dioxo-4-(trifluoromethyl)-3,6-	F F I H3C CH3	Anaerobic soil	(data submission pending)
М800Н01	dihydro-1(2H)-	$1 \times N = 0$ $Y$	Soil photolysis	5.4 (14) nd <sup>1</sup> (30)
	pyrimidinyl)benzoyl]-N'-	F O O NH	Aqueous photolysis	not detected
5. 1.	isopropylsulfamide	N S	Hydrolysis	not identified but not major <sup>2</sup>
5	EIC II CIE N O S	O H T T T NO	Aerobic aquatic	not detected
,	<b>Formula:</b> C <sub>16</sub> H <sub>15</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S <b>MW:</b> 486.83 g/mol		Anaerobic aquatic	not identified but not major <sup>2</sup>
	W W: 460.63 g/moi	F CI	Field studies	0.02 ppm (0-8, 11, nd <sup>1</sup> (124, 271, 36)
M02	N'-[2-Chloro-5-(2,6-dioxo-4-		Aerobic soil	<b>30</b> (246) 17 (330)
	(trifluoromethyl)-3,6-dihydro-	F H H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil	(data submission pending)
M800H02	1(2H)-pyrimidinyl)-4-		Soil photolysis	not detected
	fluorobenzoyl]-N-isopropyl-N-		Aqueous photolysis	not detected
	methylsulfamide	N S CH <sub>3</sub>	Hydrolysis	not identified but not major <sup>2</sup>
			Aerobic aquatic	not detected
	Formula: C <sub>16</sub> H <sub>15</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S	Ö E	Anaerobic aquatic	not identified but not major <sup>2</sup>
	MW: 486.83 g/mol	r U	Field studies	0.01 ppm (0-2, 6) nd <sup>1</sup> (360)

•					
Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	Maximum %AR (day)	Final %AR (study length)
M04 M800H04	Formula: C <sub>17</sub> H <sub>19</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>6</sub> S MW: 518.87 g/mol	F CH <sub>3</sub> H <sub>3</sub> C CH <sub>3</sub>	Aerobic soil Anaerobic soil Soil photolysis	(data submi	l but not major <sup>2</sup> ssion pending) I but not major <sup>2</sup>
		HO HN CH <sub>3</sub>	Aq. photolysis -pH5 Aq. photolysis -pH7 Hydrolysis -pH7 Hydrolysis -pH9	5.9 (15) not identified 0.95 (30) 13 (3)	3.4 (20) not identified 0.95 (30) nd <sup>1</sup> (30)
		F → Cl	Aerobic aquatic Anaerobic water Anaerobic sediment Anaerobic system		l but not major <sup>2</sup> nd <sup>1</sup> (364) nd <sup>1</sup> (364) nd <sup>1</sup> (364)
M07 M800H07	N-{4-Chloro-2-fluoro-5- [({[isopropyl (methyl) amino]		Field studies Aerobic soil Anaerobic soil	<b>52</b> (25) (data submi	nalyzed 7.2 (330) ssion pending)
WIOUTIU	sulfonyl} amino) carbonyl] phenyl}-N'-methylurea Formula: C <sub>13</sub> H <sub>18</sub> ClFN <sub>4</sub> O <sub>4</sub> S	H <sub>3</sub> C CH <sub>3</sub>	Soil photolysis Aq. photolysis -pH5 Aq. photolysis -pH7	19 (14) not detected 13 (21)	2.3 (30) not detected 13 (21)
	MW: 380.83 g/mol	HN N CH <sub>3</sub>	Hydrolysis –pH7 Hydrolysis –pH9 Aerobic water Aerobic sediment	9.2 (30) 77 (30) 20 (30) 3.7 (60)	9.2 (30) 77 (30) 19 (60) 3.7 (60)
		F CI	Aerobic system Anaerobic water Anaerobic sediment	23 (60) 62 (364) 13 (91)	23 (60) 62 (364) 6.7 (364)
			Anacrobic system Field studies	71 (91) 0.02 ppm (11, 20, 44)	68 (364) nd <sup>1</sup> (124, 271)
М08 М800Н08	N'-[2-Chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-(trifluoromethyl) tetrahydro-1(2H)-pyrimidinyl) benzoyl]-N-isopropyl-N-	F CH <sub>3</sub> H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil Soil photolysis Aqueous photolysis	19 (22) not d	41 (330) ssion pending) 18 (30) letected
	methylsulfamide  Formula: C <sub>17</sub> H <sub>19</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S  MW: 502.88 g/mol	P CI CH <sub>3</sub>	Hydrolysis Aerobic aquatic Anaerobic aquatic Field studies	not d	l but not major <sup>2</sup> etected l but not major <sup>2</sup> nd <sup>1</sup> (124, 360)

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	Maximum %AR (day)	Final %AR (study length
M15	N-{4-Chloro-2-fluoro-5-	To the control of the second o	Aerobic soil	not identifie	d but not major <sup>2</sup>
W115	[({[isopropyl (methyl) amino]	F	Anaerobic soil		ission pending)
M800H15	sulfonyl} amino) carbonyl]		Soil photolysis	9.6 (30)	9.6 (30)
	phenyl}-4-4-4-trifluoro-3,3-	H <sub>3</sub> C CH <sub>3</sub>	Aq. photolysis -pH5	3.0 (20)	3.0 (20)
•	dihydroxybutanamide	HO 130 0113	Aq. photolysis -pH7	not detected	not detected
			Hydrolysis –pH7	2.3 (30)	2.3 (30)
;	Formula: C <sub>15</sub> H <sub>18</sub> ClF <sub>4</sub> N <sub>3</sub> O <sub>6</sub> S	OH HN S N CH	Hydrolysis –pH9	<b>22</b> (30)	22 (30)
	MW: 479.84 g/mol	N 0 0 1 13	Aerobic aquatic	not o	detected
			Anaerobic water	17 (62-91)	7.1 (364)
		F CI	Anaerobic sediment	0.9 (273)	0.8 (364)
		1 01	Anaerobic system	<b>17</b> (62-91)	7.6 (364)
			Field studies		detected
M22	3-[({4-Chloro-2-fluoro-5-	E F CH <sub>3</sub>	Aerobic soil	<b>16</b> (43)	7.1 (334)
	[({[isopropyl(methyl)amino]sulfon	F T 3 H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil	(data submi	ssion pending)
M800H22	yl}amino)carbonyl]anilino}carbony		Soil photolysis	not o	letected
	l)(methyl)amino]-4,4,4-	F O N CH.	Aqueous photolysis		letected
	trifluorobutanoic acid		Hydrolysis	not identified	d but not major <sup>2</sup>
			Aerobic aquatic		letected
	Formula: C <sub>17</sub> H <sub>21</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>6</sub> S	O F CI	Anaerobic aquatic	not identified	d but not major <sup>2</sup>
	MW: 520.89 g/mol		Field studies		letected
M26	N-Methyl-2,2,2-trifluoroacetamide		Aerobic soil	18 (25)	nd¹ (334)
		, <b></b>	Anaerobic soil	(data submi	ssion pending)
M800H26	Formula: C <sub>3</sub> H <sub>4</sub> F <sub>3</sub> NO	F <b>√'</b>	Soil photolysis		d but not major <sup>2</sup>
	MW: 127.07 g/mol	CH	Aqueous photolysis		d but not major <sup>2</sup>
•		L []	Hydrolysis		d but not major <sup>2</sup>
		0	Aerobic aquatic		d but not major <sup>2</sup>
			Anaerobic aquatic	not identified	d but not major <sup>2</sup>
			Field studies	not a	nalyzed

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	Maximum %AR (day)	Final %AR (study length)
M29	Trifluoroacetic acid	The state of the s	Aerobic soil	not identified	but not quantified
W129			Anaerobic soil	(data submi	ssion pending)
M800H29	Formula: C <sub>2</sub> HF <sub>3</sub> O <sub>2</sub>		Soil photolysis	not identifie	d but not major <sup>2</sup>
TFA	MW: 114.02 g/mol		Aq. photolysis -pH5	4.8 (20)	4.8 (20)
		F <sub>v</sub> F	Aq. photolysis -pH7	29 (21)	29 (21)
(also		OH	Hydrolysis		d but not major <sup>2</sup>
formulated		F [	Aerobic water	6.9 (60)	6.9 (60)
as TFA,		Ö	Aerobic sediment	2.0 (51-60)	2.0 (60)
			Aerobic system	8.8 (60)	8.8 (60)
sodium salt)			Anaerobic water	9.2 (364)	9.2 (364)
			Anaerobic sediment	3.6 (91)	1.9 (364)
	· ·		Anaerobic system	11 (364)	11 (364)
			Field studies		nalyzed
M31	3-[Carboxy(methyl)amino]-4,4,4-	CH3	Aerobic soil	<b>18</b> (43)	8.7 (334)
	trifluorobutanoic acid	F √ T 3 a	Anaerobic soil	(data submi	ssion pending)
M800H31	and a second and a second		Soil photolysis	not identifie	d but not major <sup>2</sup>
Ž.	Formula: C <sub>6</sub> H <sub>8</sub> F <sub>3</sub> NO <sub>4</sub>	F   [	Aqueous photolysis	not identified	d but not major <sup>2</sup>
	MW: 215.13 g/mol	HO、 / OH	Hydrolysis	not identified	d but not major <sup>2</sup>
	3		Aerobic aquatic	not identified	d but not major <sup>2</sup>
			Anaerobic aquatic	not identified	d but not major <sup>2</sup>
			Field studies	not a	nalyzed
M33	1,1,1-Trifluoroacetone		Aerobic soil	not identified	d but not major <sup>2</sup>
	1,1,1-11IIIdoroaccione		Anaerobic soil	(data submi	ssion pending)
M800H33	CAS-no: 421-50-1		Soil photolysis	not identified	l but not major <sup>2</sup>
	CAS-110. 421-30-1		Aq. photolysis -pH5	not detected	not detected
	Formula: C <sub>3</sub> H <sub>3</sub> F <sub>3</sub> O		Aq. photolysis -pH7	30 (21)	30 (21)
	MW: 112.05 g/mol	e F	Hydrolysis –pH7	4.7 (30)	4.7 (30)
	WWW. 112.05 g/mor	'	Hydrolysis –pH9	74 (21)	73 (30)
		F \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Aerobic water	23 (7)	3.2 (60)
		• <u>∥</u>	Aerobic sediment	nd¹	$nd^1$
		U	Aerobic system	23 (7)	3.2 (60)
			Anaerobic water	15 (62)	nd <sup>1</sup> (364)
			Anaerobic sediment	0.9 (62)	nd <sup>1</sup> (364)
			Anaerobic volatiles	13 (160-364)	13 (364)
			Anaerobic system	<b>25</b> (62)	13 (364)
			Field studies		nalvzed

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	Maximum %AR (day)	Final %AR (study length)
TFP	1,1,1-Trifluoro-2-propanol		Aerobic soil	not identified	l but not major <sup>2</sup>
ırı			Anaerobic soil	(data submi	ssion pending)
	CAS-no: 374-01-6		Soil photolysis	not identified	l but not major <sup>2</sup>
		F\\ CH <sub>3</sub>	Aqueous photolysis	not identified	l but not major <sup>2</sup>
*	Formula: C <sub>3</sub> H <sub>5</sub> F <sub>3</sub> O	E 7 13	Hydrolysis	not identified	l but not major <sup>2</sup>
	MW: 114.07 g/mol	Γ <u> </u>	Aerobic aquatic	not identified	l but not major <sup>2</sup>
		ОН	Anaerobic water	16 (62)	0.4 (364)
			Anaerobic sediment	3.4 (62)	nd <sup>1</sup> (364)
	· 1		Anaerobic volatiles	<b>24</b> (160-364)	24 (364)
			Anaerobic system	30 (62)	24 (364)
			Field studies		nalyzed
D J4 0	Formula: C <sub>17</sub> H <sub>15</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>6</sub> S	_ CH	Aerobic soil	not identifie	d but not major <sup>2</sup>
Product 8	MW: 516.86 g/mol	FF_Y H <sub>3</sub> CCH <sub>3</sub>	Anaerobic soil	(data submi	ssion pending)
	WIV. 510.00 g/moi	N O	Soil photolysis	17 (15)	17 (15)
		F ∥ ſ Ŭ Q∖ ∫NH	Aqueous photolysis	not identified	l but not major <sup>2</sup>
		N S	Hydrolysis	not identifie	l but not major <sup>2</sup>
			Aerobic aquatic		l but not major <sup>2</sup>
		Ö 人人。)	Anaerobic aquatic		d but not major <sup>2</sup>
		F	Field studies	not a	nalyzed
TT 1	Unknown compound with t <sub>R</sub> 12.5-		Aerobic soil	not identified	l but not major <sup>2</sup>
Unknown	13.2 min that formed under	· · · · · · · · · · · · · · · · · · ·	Anaerobic soil	(data submi	ssion pending)
3/4/7/6	irradiated conditions in the aqueous		Soil photolysis	not identifie	d but not major <sup>2</sup>
	photolysis study, including		Aq. photolysis -pH5	15 (20)	15 (20)
* .	unknowns 3 (phenyl-labeled) and 4	Unknown	Aq. photolysis -pH7	<b>10</b> (21)	10 (21)
	(uracil-labeled) in the pH5 study		Hydrolysis		d but not major <sup>2</sup>
	and unknowns 7 (phenyl-labeled)		Aerobic aquatic	not identified	l but not major <sup>2</sup>
	and 6 (uracil-labeled) in the pH7		Anaerobic aquatic	not identified	l but not major <sup>2</sup>
	study.	· · · · · · · · · · · · · · · · · · ·	Field studies	not a	nalyzed

<sup>1 &</sup>quot;nd" means that the compound was not detected.
2 "not identified but not major" means that the compound was not identified and that any unidentified compounds each accounted for less than 10% of the applied.

Table 3. Minor Organic Environmental Degradates of Saflufenacil.

Code	Chemical name	Chemical structure	Study Type	Maximum %AR (day)	Final %AR (study length)
M06	N-[2-Chloro-4-fluoro-5-(3-methyl-	- F CH3	Aerobic soil	identified but	not quantified
	2,6-dioxo-4-	F_ F T 3 H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil	(data submis	sion pending)
M800H06	(trifluoromethyl)tetrahydro-1(2H)-		Soil photolysis		entified
•	pyrimidinyl)benzoyl]-N'-	F D O NH	Aqueous photolysis	not id	entified
•	isopropylsulfamide	N S	Hydrolysis	not id	entified
			Aerobic aquatic	not id	entified
	Formula: C <sub>16</sub> H <sub>17</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S	i	Anaerobic aquatic	not id	entified
	<b>MW:</b> 488.85 g/mol	F Cl	Field studies		alyzed
M11	N'-[2-Chloro-5-(2,6-dioxo-4-	F, F H H <sub>3</sub> C, CH <sub>3</sub>	Aerobic soil	not ar	alyzed
	(trifluoromethyl)-3,6-dihydro-1(2H)-	F H O H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil	(data submis	sion pending)
M800H11	pyrimidinyl)-4-fluorobenzoyl]-N-		Soil photolysis	<del></del>	alyzed
	isopropylsulfamide	F O O NH	Aqueous photolysis		alyzed
		N N N N N N N N N N N N N N N N N N N	Hydrolysis		alyzed
	Formula: C <sub>15</sub> H <sub>13</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S		Aerobic aquatic		etected
	<b>MW:</b> 472.81 g/mol	o <sub>F</sub>	Anaerobic aquatic	not ar	alyzed
		F GI	Field studies	not ar	alyzed
M16	2-Chloro-4-fluoro-N-{isopropyl	F F OH H <sub>3</sub> C CH <sub>3</sub>	Aerobic soil		entified
M800H18	(methyl)-amino] sulfonyl}-5-[(4,4,4-	OH H <sub>3</sub> C CH <sub>3</sub>	Anaerobic soil		sion pending)
MICOURITO	trifluoro-2,3-dihydroxybutanyl)	F H PO. N.	Soil photolysis		entified
	amino] benzamide	l 人 が 人 人 :S´、 `CH。	Aqueous photolysis		entified
		HO A NO O	Hydrolysis		entified
	Formula: C <sub>15</sub> H <sub>18</sub> ClF <sub>4</sub> N <sub>3</sub> O <sub>6</sub> S		Aerobic aquatic		entified
	<b>MW:</b> 479.84 g/mol	F	Anaerobic water	8.4 (364)	8.4 (364)
		<u> </u>	Anaerobic sediment	0.9 (273-364)	0.9 (364)
			Anaerobic system	9.3 (364)	9.3 (364)
			Field studies		alyzed
M18	2-Chloro-4-fluoro-N-	H <sub>3</sub> C CH <sub>3</sub>	Aerobic soil		entified
M800H18	[(isopropylamino) sulfmony]-5-	N O	Anaerobic soil		sion pending)
MOOOTITO	{[(methylamino) carbonyl] amino}		Soil photolysis		entified
	benzamide	H <sub>3</sub> C O O NH	Aqueous photolysis		entified
		V V XI V-	Hydrolysis		entified
	Formula: C <sub>12</sub> H <sub>16</sub> ClFN <sub>4</sub> O <sub>4</sub> S		Aerobic aquatic	not ide	
	<b>MW:</b> 366.80 g/mol		Anaerobic water	6.2 (273)	6.0 (364)
		Y U	Anaerobic sediment	0.9 (364)	0.9 (364)
			Anaerobic system	7.0 (273)	6.7 (364)
			Field studies	not an	alyzed

Code	Chemical name	Chemical structure	Study Type	Maximum Final %AR %AR (day) (study length)	
M24	(2E)-3-({[4-Chloro-2-fluoro-5-	F,F H	Aerobic soil	identified but not quantified	
	({[(methylamino)sulfonyl]		Anaerobic soil	(data submission pending)	
M800H24	amino}carbonyl)aniline]carbonyl}ami	l f Y Y Po H	Soil photolysis	not identified	
	no)-4,4,4-trifluoro-2-butenoic acid	HO HN S CH,	Aqueous photolysis	not identified	
		HO HN N S CH <sub>3</sub>	Hydrolysis	not identified	
	Formula: C <sub>13</sub> H <sub>11</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>6</sub> S		Aerobic aquatic	not identified	
	<b>MW:</b> 462.77 g/mol	o F Cl	Anaerobic aquatic	not identified	
			Field studies	not analyzed	
M25	2-Chloro-4-fluoro-5-(3-methyl-2,6-	_ <sub>E</sub> ÇH <sub>3</sub>	Aerobic soil	identified but not quantified	
	dioxo-4-(trifluoromethyl)-3,6-	F T 3	Anaerobic soil	(data submission pending)	
M800H25	dihydro-1(2H)-		Soil photolysis	not identified	
	pyrimidinyl)benzamide	F    [	Aq. photolysis -pH5	2.9 (20) 2.9 (20)	
		\ \N\ \\ \\\	Aq. photolysis -pH7	1.7 (15) 1.6 (21)	
	Formula: C <sub>13</sub> H <sub>8</sub> ClF <sub>4</sub> N <sub>3</sub> O <sub>3</sub>	Hydrolysis	not identified		
		b 人人	Aerobic aquatic	not identified	
		Anaerobic aquatic	not identified		
			Field studies	not analyzed	
M27	N-[2-Chloro-5-(2,6-dioxo-4-	F_FH H <sub>3</sub> CCH <sub>3</sub>	Aerobic soil	identified but not quantified	
M800H27	(trifluoromethyl)tetrahydro-1(2H)-pyrimidinyl)-4-fluorobenzoyl]-N'-	$1 \times 10^{-13}$	Anaerobic soil	(data submission pending)	
MISUUH2/			Soil photolysis	not identified	
	isopropylsulfamide	F O NH	Aqueous photolysis	not identified	
		M N N	Hydrolysis	not identified	
	Formula: C <sub>15</sub> H <sub>15</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S MW: 474.82 g/mol		Aerobic aquatic	not identified	
		o <sub>E</sub>	Anaerobic aquatic	not identified	
			Field studies	not analyzed	
M28	N-[2-Chloro-4-fluoro-5-(3-methyl-	CH3	Aerobic soil	identified but not quantified	
	2,6-dioxo-4-	F F F S	Anaerobic soil	(data submission pending)	
M800H28	(trifluoromethyl)tetrahydro-1(2H)-		Soil photolysis	not identified	
•	pyrimidinyl)benzoyl]-N'-	F Y Y Q II	Aqueous photolysis	not identified	
	methylsulfamide	N S CH <sub>3</sub>	Hydrolysis	not identified	
			Aerobic aquatic	not identified	
	Formula: C <sub>14</sub> H <sub>13</sub> ClF <sub>4</sub> N <sub>4</sub> O <sub>5</sub> S	ö 人人 ''	Anaerobic aquatic	not identified	
	MW: 460.79 g/mol	F´ `CI	Field studies	not analyzed	

Code	Chemical name	Chemical structure	Study Type	Maximum Final %AR %AR (day) (study length)
M30	2-Chloro-4-fluoro-5-(3-methyl-2,6-	<sub>−</sub> <sub>F</sub> ÇH₃	Aerobic soil	identified but not quantified
M800H30	dioxo-4-(trifluoromethyl)tetrahydro-	xo-4-(trifluoromethyl)tetrahydro-	Anaerobic soil	(data submission pending)
MOUNTSU	1(2H)-pyrimidinyl)benzamide		Soil photolysis	not identified
			Aqueous photolysis	not identified
	Formula: C <sub>13</sub> H <sub>10</sub> ClF <sub>4</sub> N <sub>3</sub> O <sub>3</sub>	NH <sub>2</sub>	Hydrolysis	not identified
	<b>MW:</b> 367.69 g/mol	[	Aerobic aquatic	not identified
		0	Anaerobic aquatic	not identified
		F G	Field studies	not analyzed
M35	N-[4-Chloro-2-fluoro-5-	H <sub>3</sub> C CH <sub>3</sub>	Aerobic soil	identified but not quantified
M800H35	({[(isopropylamino) sulfonyl] amino}	$H_2N \downarrow 0$	Anaerobic soil	(data submission pending)
MIGOUIISS	carbonyl) phenyl] urea	HN S NH	Soil photolysis	not identified
		HN S	Aqueous photolysis	not identified
	Formula: C <sub>11</sub> H <sub>14</sub> ClFN <sub>4</sub> O <sub>4</sub> S	I Y Y N 'o	Hydrolysis	not identified
	<b>MW:</b> 352.77 g/mol		Aerobic aquatic	not detected
4 f		F Cl	Anaerobic aquatic	not identified
			Field studies	not analyzed
Product 3	2-Chloro-5-[2,6-dioxo-4-	F. F H	Aerobic soil	not identified
	(trifluoromethyl)-3,6-	X N 0	Anaerobic soil	(data submission pending)
	dihydropyrimidin-1(2H)-yl]-4-		Soil photolysis	9.2 (30) 9.2 (30)
	fluorobenzamide		Aqueous photolysis	not identified
		NH <sub>2</sub>	Hydrolysis	not identified
	Formula: C <sub>12</sub> H <sub>6</sub> ClF <sub>4</sub> N <sub>3</sub> O <sub>3</sub>		Aerobic aquatic	not identified
	MW: 351.65	F CI	Anaerobic aquatic	not identified
			Field studies	not analyzed
Hydroxyl	2-Chloro-5[4-difluoro(hydroxyl)	LIG F CH <sub>3</sub>	Aerobic soil	not identified
methyl	methyl]-(3-methyl-2,6-dioxo-3,6-	HO F I G H <sub>3</sub> C CH <sub>3</sub>	,	(data submission pending)
•	dihydropyrimidin-1(2H)-yl-N-		Soil photolysis	not identified
degradate	{[isopropyl(methyl)amino]sulfonyl}	F   O O N	Aq. photolysis -pH5	5.7 (7) 3.4 (20)
	benzamide	N, S, CH,		1.3 (21) 1.3 (21)
			Hydrolysis	not identified
	Formula: C <sub>17</sub> H <sub>19</sub> ClF <sub>2</sub> N <sub>4</sub> O <sub>6</sub> S	0	Aerobic aquatic	not identified
e de la companya de l	MW: 480.88 g/mol	<b>→</b> Cl	Anaerobic aquatic	not identified
<u> </u>			Field studies	not analyzed